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CA 2412296 A1 2004/05/21

(21) 2 412 296

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(22) Date de dépôt/Filing Date: 2002/11/21

(41) Mise à la disp. pub./Open to Public Insp.: 2004/05/21

(51) Cl.Int.⁷/Int.Cl.⁷ D06F 58/04

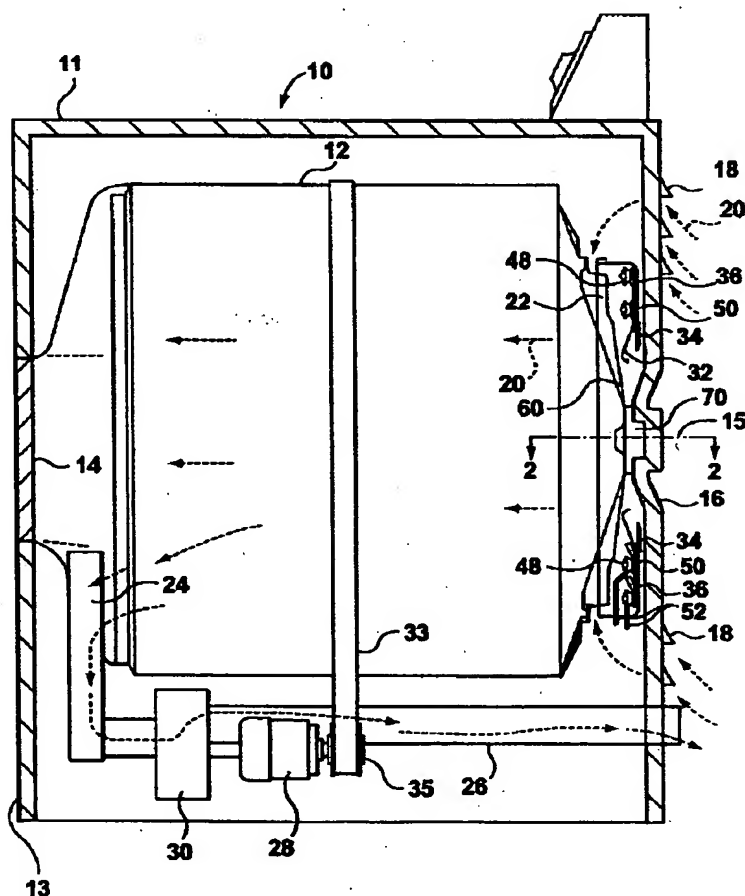
(71) Demandeur/Applicant:
CAMCO INC., CA

(72) Inventeur/Inventor:
ST. LOUIS, ROBERT MAURICE, CA

(74) Agent: CRAIG WILSON AND COMPANY

(54) Titre : PALIER DE TAMBOUR DE SECHEUSE

(54) Title: DRYER DRUM BEARING ASSEMBLY



(57) Abrégé/Abstract

A clothes dryer has a bearing assembly for supporting and grounding the rotating drum of the dryer while rotating about a substantially horizontal axis. The bearing assembly has a shaft having a first end portion mounted in fixed relation to a rear wall

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(57) Abrégé(suite)/Abstract(continued):

of the drum to rotate therewith. The assembly includes a rear panel of the dryer having a recessed panel wall portion spaced rearwardly of the rear panel of the dryer to define a recessed bearing chamber. The assembly further includes a bearing retainer mounted to the rear panel and inserted into the recessed bearing chamber. The bearing retainer has an opening and a bearing seat portion located within the recessed bearing chamber for supporting at least a portion of the bearing shaft for rotation therewith within the recessed bearing chamber. The bearing retainer having a spaced apart legs to nest a ground strap to electrically ground the rotating drum to the grounded rear panel of the dryer.

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DRYER DRUM BEARING ASSEMBLY
ABSTRACT OF THE DISCLOSURE

A clothes dryer has a bearing assembly for supporting and grounding the rotating drum of the dryer while rotating about a substantially horizontal axis. The bearing assembly has a shaft having a first end portion mounted in fixed relation to a rear wall of the drum to rotate therewith. The assembly includes a rear panel of the dryer having a recessed panel wall portion spaced rearwardly of the rear panel of the dryer to define a recessed bearing chamber. The assembly further includes a bearing retainer mounted to the rear panel and inserted into the recessed bearing chamber. The bearing retainer has an opening and a bearing seat portion located within the recessed bearing chamber for supporting at least a portion of the bearing shaft for rotation therewith within the recessed bearing chamber. The bearing retainer having a spaced apart legs to nest a ground strap to electrically ground the rotating drum to the grounded rear panel of the dryer.

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DRYER DRUM BEARING ASSEMBLY

FIELD OF THE INVENTION

The present invention relates to a clothes dryer and in particular to a support bearing structure for supporting and electrically grounding a drum of the clothes dryer.

BACKGROUND OF THE INVENTION

In the past, bearing structures used in domestic clothes dryers have been expensive to manufacture, due to a large extent on the number parts and dictated by the design. Typically the bearing structure comprises a shaft carried by a rotating drum and a molded plastic bearing fixed to a stationary wall of the dryer. The grounding of the drum is done by a formed metallic spring loaded blade that is forced against the end of the shaft. The stationary wall is typically mounted spaced inwardly of the rear outer panel wall of the dryer. The use of such a stationary wall mounted inwardly of the rear panel limits the size of the dryer drum mounted within the cabinet. Examples of such bearings used in clothes dryers are shown in U.S. patent 3,009,259 issued to Simpson, U.S. patent 3,429,056 issued to Metzger, U.S. patent 3,721,015 issued to Sisler et al, U.S. patent 4,069,596 issued to Sisler, U.S. patent 4,467,534 issued to Murase and U.S. patent 6,062,049 issued to Martinsson.

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Other clothes dryer bearing assemblies that are mounted to the rear panel wall of the dryer or pass through such a wall as shown in US patent 3,483,632 issued to Triplett, U.S. patent 3,567,297, issued to Triplett et al, U.S. patent 3,805,408 issued to Shadley, and U.S. patent 5,483,756 issued to Heyder. However, these patents all disclose some portion of the bearing assembly being positioned outside the cabinet.

With the recent increases in drum size utilized in clothes dryers, it is becoming more advantageous for the drum to utilize as much space as possible within the cabinet. As a result the clearance space for the bearings and the drum grounding means within the dryer cabinet have become more critical.

Accordingly, there is a need to provide a new and improved clothes dryer having a new and improved bearing, bearing support structure and drum grounding housed within the dryer cabinet that improves clearance space and drum capacity.

SUMMARY OF THE INVENTION

The present invention relates to the use of a bearing assembly within a clothes dryer wherein the bearing assembly and grounding means permits for reduced space between the rotating drum rear end head and the rear panel of the dryer cabinet.

The clothes dryer of the present invention has a bearing assembly for supporting the rotating drum of the dryer for rotation about a substantially horizontal axis. The bearing assembly also provides a low cost grounding means for grounding the drum assembly of the dryer. The bearing assembly has a shaft having a first end portion mounted in fixed relation to a rear wall of the drum to rotate therewith. The assembly includes a rear panel of the dryer having a recessed panel wall portion that defines a bearing chamber. The assembly further includes a bearing retainer mounted to the rear panel and inserted into the recessed bearing chamber. The bearing retainer has an opening and a bearing seat portion. A small rectangular flat bearing pad member is folded and pushed into the seat portion. The bearing retainer and

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bearing assembly are located within the recessed bearing chamber for supporting at least a portion of the bearing shaft for rotation therewith within the recessed bearing chamber.

The bearing retainer preferably provides a nest for positively locating a grounding strap to provide proper grounding of the drum when the bearing retainer is in the recessed chamber and the drum shaft is in its operating position.

The present invention provides for an effective bearing arrangement which allows for a positive and easily assembled bearing and drum grounding means for a clothes dryer wherein the rear wall of the clothes dryer has a recessed portion to permit for a larger drum structure to be located within the clothes dryer without any of the bearing assembly located outside of the dryer cabinet.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the nature and objects of the present invention, reference may be had to the accompanying diagrammatic drawings in which:

Figure 1 is a view showing an electric clothes dryer having the bearing structure of the present invention;

Figure 2 is a top sectional view taken along shaft axis line 2-2 in Figure 1 and illustrates the bearing retainer and the grounding strap of the present invention;

Figures 3a and 3b are respectively front and rear perspective views of the bearing retainer of the present invention, and Figure 3b shows the location of the grounding strap in the bearing retainer during assembly;

Figures 4a and 4b are respectively front and rear perspective views of the cover for the bearing of the present invention; and,

Figures 5a and 5b illustrate the bearing pad respectively in its free shape and operating shape;

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Figure 6 illustrates the grounding strap in its free shape; and

Figure 7 is a partial section enlarged view illustrating the flexible connection and mounting of the bearing retainer to the rear panel of the dryer.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figure 1 there is shown a clothes dryer 10 having a rotating drum 12 mounted within the dryer cabinet 11 for rotation substantially about horizontal axis 15. The rotating drum has an open front through which access can be gained through door 14 of the dryer 10 for the insertion and removal of clothing and other articles from the drum. The clothes dryer 10 has a rear panel 16 provided with a series or plurality of louvers 18 through which air may be drawn into the interior of the dryer 10. The airflow is shown by arrows 20 passing through the louvers, through a series of openings (not shown) in the rear end head 22 of the dryer drum 12, through front ducting 24 and out through exhaust ducting 26. Motor 28 rotates fan 30 to draw the air 20 through the drum 12. The motor 28 through pulley 35 and belt 33 also causes the rotation of the dryer drum 12.

A heater housing 32 is mounted by suitable bolts 34 to the rear panel 16 of the dryer 10. The heater housing 32 is adjacent the end head 22. The heater housing 32 has a rear wall 36 that is spaced from the rear end head 22.

Helically wound heater coils 48 are mounted via electrical insulators 50 to the rear wall 36 of the heater housing 32. The coils 48 are spaced from the rear walls 36 and from the end head 22 of the dryer drum. The heater coils 48 are connected to a source of electrical supply through terminals 52. When electrical energy is fed through terminals 52 to coils 48, the heating coils warm air passing over the coils and towards the openings 23 in the end head 22 and perforated wall 60 of the dryer drum 12.

The drum 12 is mounted to the front panel 13 through a bulkhead (not shown) that supports the front portion of the drum. The rear portion of the

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drum 12 is supported to the rear panel 16 of the dryer cabinet by bearing assembly 70.

Referring to Figure 2, the bearing assembly 70 is shown interconnecting the rotating drum 12 to the rear panel 16 of the cabinet of clothes dryer 11. The drum 12 is connected to the end head 22 of the drum 12. Also connected with the end head 22 is perforated wall 60 that distributes heated air into the dryer drum. The perforated wall 60 has a recessed button shaped portion 72 and is connected at raised land portions 74 either by screws or rivets (not shown) to an end head cover 76 of the bearing assembly 70.

Referring to Figures 4a and 4b, enlarged views of the end head cover 76 are shown. The end head cover 76 has a raised flattened dome shaped central portion 77 that is raised by a predetermined distance to define, between it and the recessed portion 72 of the perforated wall 60, a chamber 78 for receiving through the cover 76 a shaft 80. The cover 76 has openings 130 which will permit for the fastening of cover 76 to the rear end head 22 and the perforated wall 60.

Shaft 80 is elongated and has one end 132 having threads 134 onto which a nut 82 is secured. Shaft 80 has a shoulder 84 which engages the dome 77 of cover 76 when the shaft 80 is passed through an aperture (not shown) in the cover 76 and the nut 82 is tightened against the inner surface 79 of the cover 76. As a result, the shaft 80 rotates with rotation of the cover 76 which rotates with rotation of the drum 12 and end head 22. Thus securing of the nut 82 onto the stem 80 against inner surface 79 of the cover 76 effectively mounts the drum 12, perforated wall 60 and end head 22 for rotation with the shaft 80. The other end 81 of the shaft 80 is inserted into bearing support or bearing retainer 88.

Referring to Figures 2, 3a, 3b, 5a, 5b, 6 and 7, the improvements of the preferred aspects of the present invention are now described. Bearing retainer 88 has a flange portion 89 that overlaps the rear panel 16 and is

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mounted thereto by snap action locking tabs 99. The rear panel 16 has a recessed wall 92 recessed from the rear panel 16 by side walls 93 to define a receiving or recessed bearing chamber 95. Two tabs 112 are pierced and formed out of panel 16 adjacent corners 97 of walls 93 and 92.

The bearing retainer 88 is inserted into recessed chamber 95 of rear panel 16 and has an opening 94 (see Figures 3a and 3b) through which shaft 80 may be inserted. The opening 94 opens up into an enlarged channel 96 that has an upper curved surface 98 adjacent to which the shaft 80 is positioned and a lower curved seat 100 of larger radius than the radius of the shaft 80. A bearing pad 102 is curved from its normal state shown in Figure 5a into its curved shape illustrated in Figure 5b and inserted onto the lower curved seat 100 for supporting the stem 80. The bearing pad 102 may comprise a suitable plastic material of low friction such as, for example, polytetrafluoroethylene (PTFE), more commonly known by its trade name Teflon.

The bearing retainer 88 also has four protruding legs 122 which abut the recessed wall 92 of the recessed chamber 95 of the rear panels 16. The legs 122 act to positively locate the bearing retainer 88 within the recessed chamber 95. Legs 122 also positively locate, or nest between the two pairs of spaced apart legs 122 and across the channel 96, a ground strap 110 shown in broken line in Figure 3b and in its normal flat state in Figure 6. The ground strap 110 is normally a flat elongated spring steel blade or leaf spring like member.

During assembly, the bearing pad 102 is placed onto seat 100 of bearing retainer 88. The grounding strap 110 is placed between legs 122. The bearing retainer 88 is then placed within the recessed chamber 95 with legs 122 abutting portions of walls 92 and 93. Ground strap 110 is held captive by legs 122, walls 93 and tabs 112. As the shaft 80 is inserted through opening 94 into chamber 95, it engages the ground strap 110. The ground strap 110 is placed in a recessed channel formed by legs 122 of

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bearing retainer 88. The shaft 80 when inserted into the bearing retainer 88 has a tip portion 100 on its one end 81 that positively pushes and curves the strap 110 against tabs 112 to create a positive grounding contact thereby grounding the drum and shaft assembly to the grounded rear panel 16.

The bearing retainer flange 89 that is adapted to overlap inside surface 83 of rear panel 16 when the bearing retainer 88 is inserted into recessed chamber 95. The flange 89 has a slotted opening 140 and projecting hook like locking tabs 99. The slotted aperture 140 permits the tabs 99 to flex relative to the flange 89. As illustrated in Figure 7, the rear panel 16 has openings 90 pierced in the panel 16 that provide a recessed flange portion 91 extending behind the panel 16. The tabs 99 of flange 89 are flexed to pass in through opening 9 of panel 16. The tabs 99 have a barb 101 that snaps over the end of flange 91 to thereby secure the bearing retainer 88 against the rear panel 16 with the legs 122 of the bearing retainer seated in the recessed chamber 95.

It should be understood that the thickness of the shoulder 84 and the displacement of the domes 77 of the cover 76 and the bearing retainer 88 define the clearance between the end head 22 of the drum 12 and the rear panel 16. The present invention provides for an effective bearing and grounding arrangement which allows for a positive and easily assembled bearing for a clothes dryer wherein the rear wall 16 of the clothes dryer has a recessed portion to permit for a larger drum structure to be located within the clothes dryer without any of the bearing assembly being located outside of the dryer cabinet 11. Further, in some alternative embodiments, the recessed chamber 95 may extend outwardly from the rear panel. It should be understood that in some cases a protruding chamber 95 would be inconsequential to positioning the dryer adjacent a room wall because a greater spacing distance is required by the dryer from the room wall to accommodate venting of exhaust gas through the rear panel 16 of the dryer 10.

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What is claimed is:

1. A clothes dryer having a cabinet with a rear panel, a drum assembly and a bearing assembly for supporting the drum assembly for rotation about a substantially horizontal axis from the rear panel, said bearing assembly comprising:

a shaft having a first end portion mounted in fixed relation to a rear wall of the drum to rotate therewith; and,

the rear panel of the dryer having a recessed panel wall portion to define a recessed bearing chamber within the dryer cabinet;

a bearing retainer mounted to the rear panel and inserted into the recessed bearing chamber, the bearing retainer having an opening and a bearing seat portion located within the recessed bearing chamber for supporting at least a portion of the bearing shaft for rotation therewith within the recessed bearing chamber.

2. The clothes dryer of claim 1 wherein the bearing assembly further includes a ground strap member located within and contacting the recessed bearing chamber, and the shaft having a second end engaging the ground strap to electrically ground the shaft and drum assembly.

3. The clothes dryer of claim 2 wherein the recessed bearing chamber has side walls extending between the rear panel and the recessed panel wall portion, the bearing assembly further including tabs extending into the recessed chamber adjacent the side walls and rear panel wall portion, and the ground strap member comprises a leaf spring member having ends thereof in contact with tabs on the sidewalls of the recessed bearing chamber.

4. The clothes dryer of claim 1 wherein the bearing retainer seat portion has a larger diameter than the shaft and a bearing pad is placed on the bearing seat portion for supporting engagement with at least a portion of the shaft.

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5. The clothes dryer of claim 1 wherein the bearing retainer further includes leg positioning members extending forward of the bearing seat portion to positively locate the bearing retainer relative to the recessed rear panel wall portion, and the bearing retainer further including a flange overlapping the rear panel wall adjacent the recessed rear bearing chamber for mounting of the bearing retainer to the rear panel of the dryer.

7. The clothes dryer of claim 5 wherein the two pairs of spaced apart leg positioning members nest the ground strap therebetween

8. The clothes dryer of claim 5 wherein the rear panel includes at least two openings spaced on opposite sides of the recessed bearing chamber and the flange of the bearing retainer has locking tabs that project into the two openings of the rear panel to secure the bearing retainer to the rear panel.

9. The clothes dryer of claim 8 wherein the two openings spaced on opposite sides of the recessed bearing chamber further comprise a recessed flange portion extending behind the panel and the locking tabs further include a barb that locks over the recessed flange.

10. The clothes dryer of claim 8 wherein the bearing retainer flange includes a slotted aperture adjacent the bearing locking tabs to permit flexing of the locking tabs relative to the bearing retainer flange.

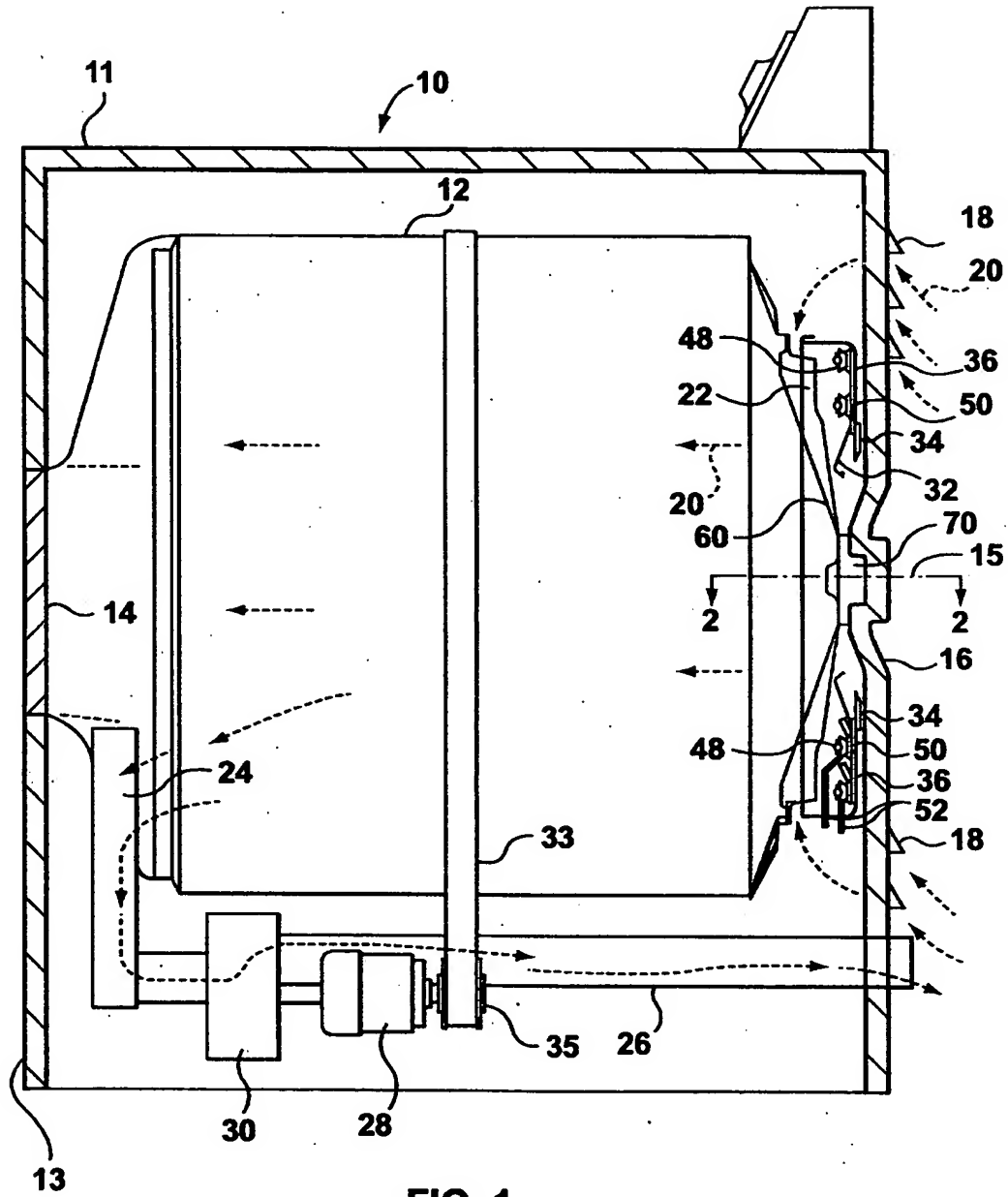
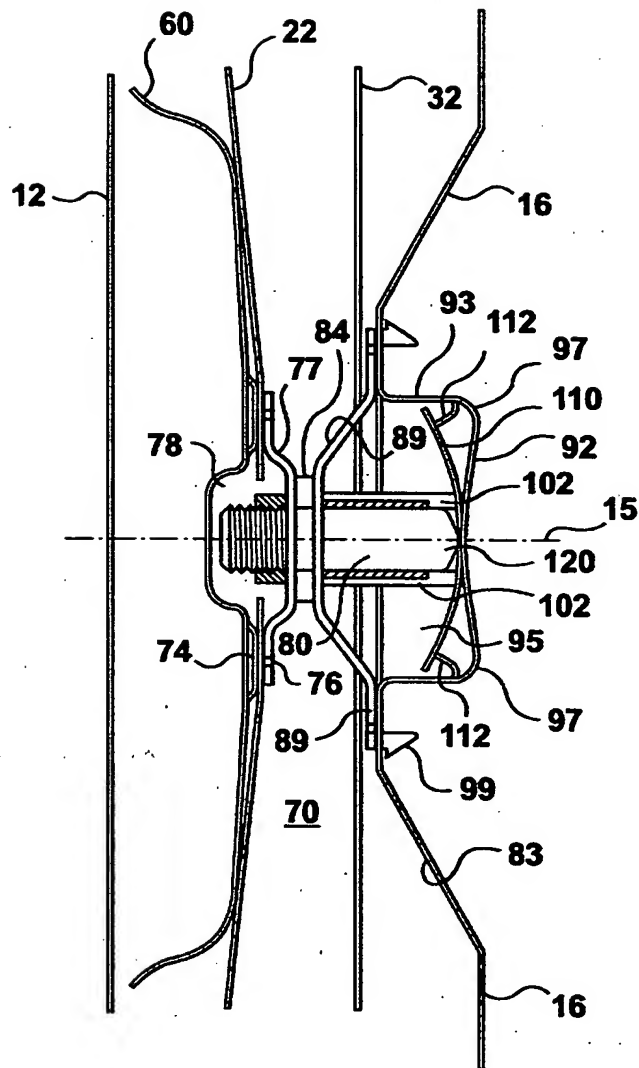


FIG. 1

**FIG. 2**

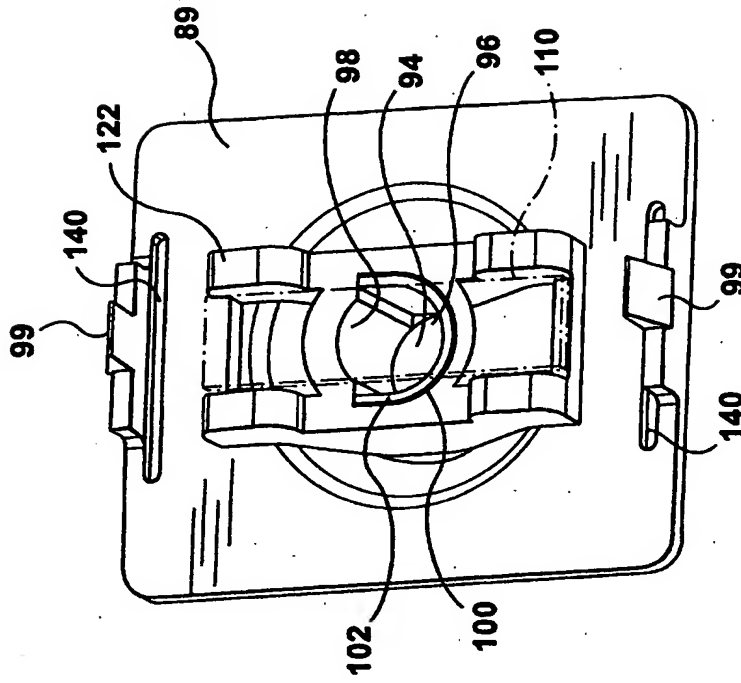


FIG. 3a

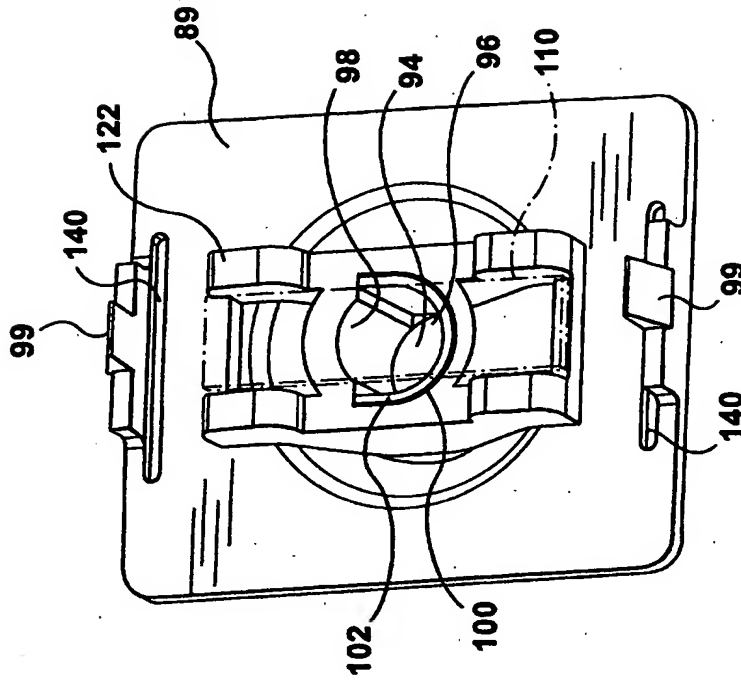


FIG. 3b

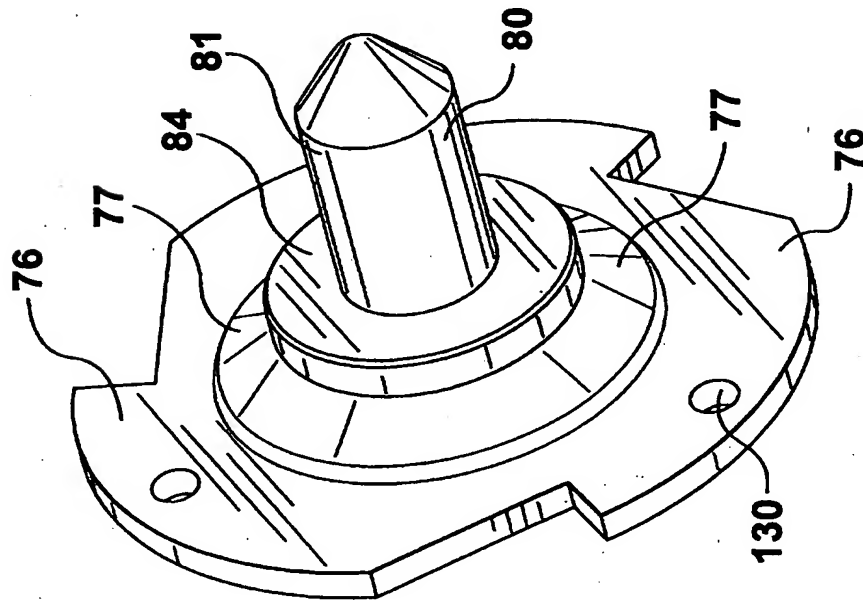


FIG. 4a

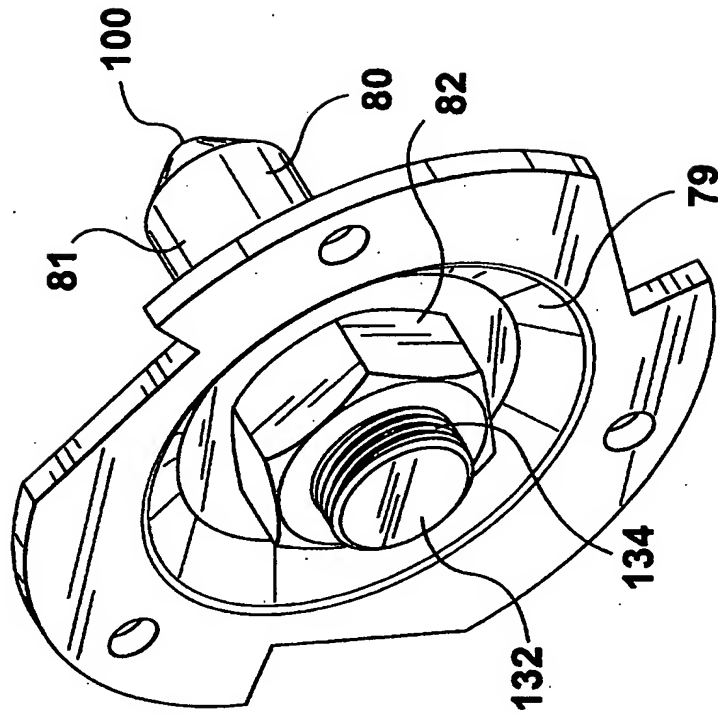


FIG. 4b

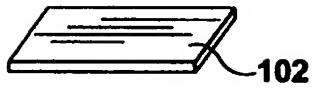


FIG. 5a

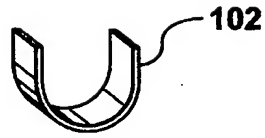


FIG. 5b

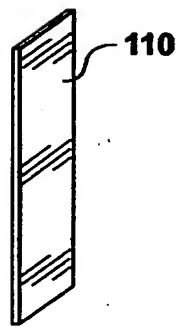


FIG. 6

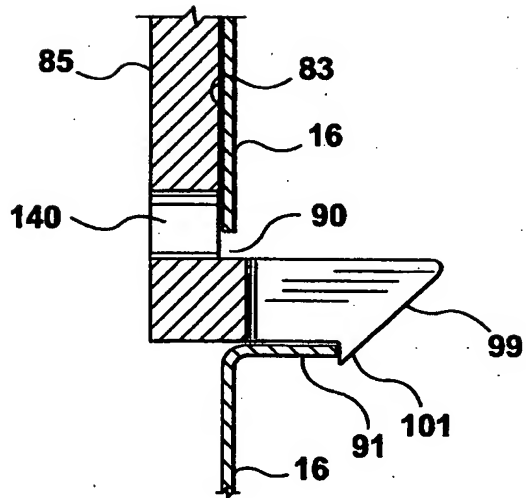
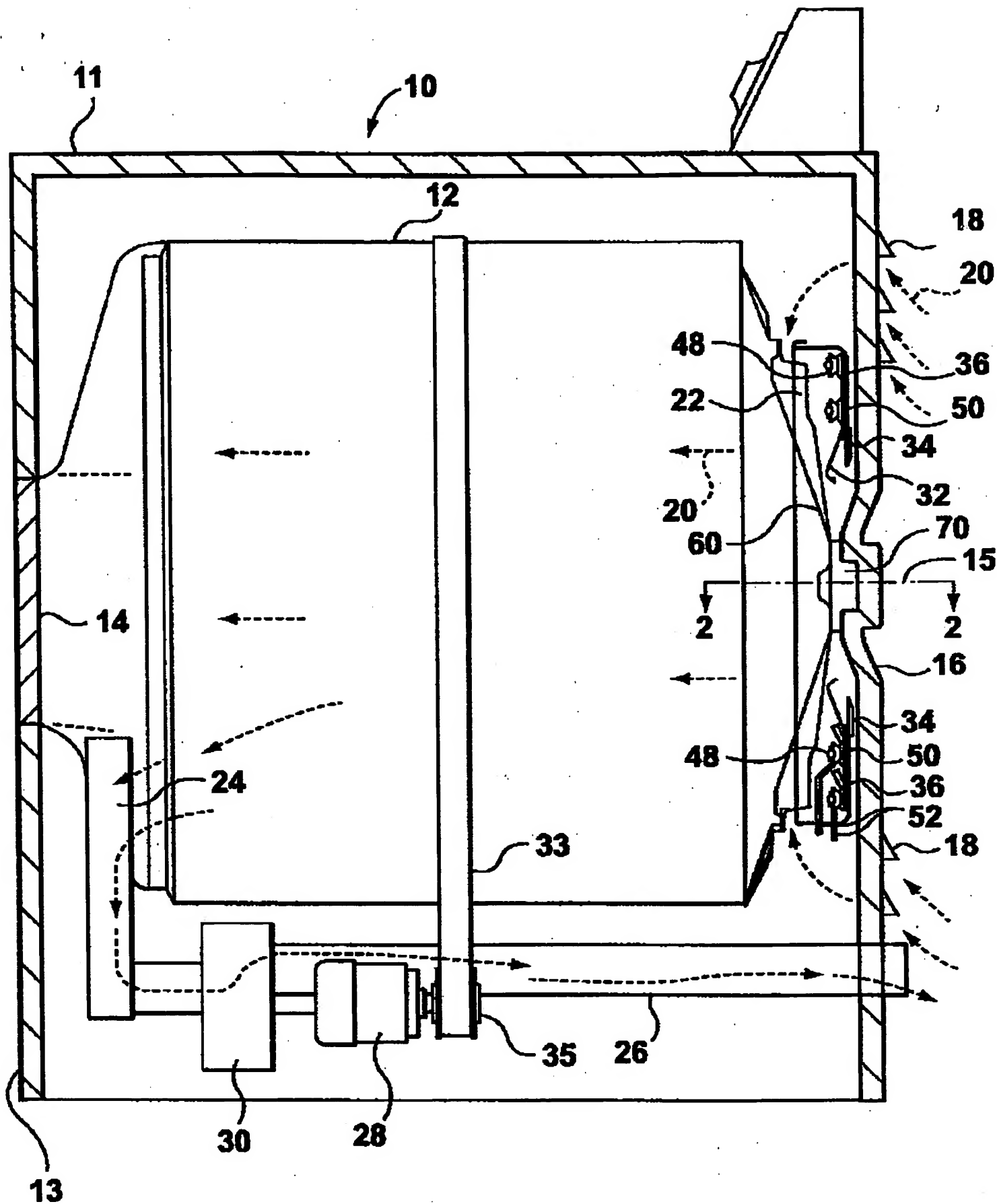


FIG. 7



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